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Date: June 29, 2001 Express Mail Label No. EL 762237403 4S

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Attorney's Docket No.: 2847.1001-011

A SYSTEM AND METHOD FO EFFICIENT ILLUMINATION IN COLOR  
PROJECTION DISPLAYS

RELATED APPLICATIONS

This application is a continuation application of U.S. Application No. now U.S. Patent number 6,417,967  
08/443,180 filed on May 17, 1995 which is a continuation-in-part application of U.S.  
Application No. 08/330,339 filed October 27, 1994 (abandoned) of the entire teachings  
of which are incorporated herein by reference.

ABSTRACT

An illumination system for a color projection display. In one embodiment a broad spectrum light source illuminates a multilevel optical phase element which disperses the broad spectrum light from the light source by diffraction. A display having a number of pixel elements, each capable of transmitting a predetermined spectral region, is positioned within the near field region of the multilevel optical phase element so as to receive the light dispersed by the multilevel phase element.

1 This invention was made with government support under contract  
2 number F19628-85-C-0002 awarded by the Air Force. The government has  
3 certain rights in the invention.

#### 4 RELATED APPLICATIONS

5 This application is a continuation in-part application of U.S.  
Patent Application Serial No. 08/330,339, filed October 27, 1994.

#### 7 FIELD OF THE INVENTION

8 The invention relates to illumination systems for video displays  
9 and more specifically to illumination systems for color projection  
video displays.

#### 13 BACKGROUND OF THE INVENTION

14 Currently used techniques for color projection displays tend to  
15 be relatively inefficient in their light utilization. Such low  
16 efficiency limits the brightness of the display, which in effect  
limits the acceptable amount of ambient lighting in a viewing  
environment.

17 In certain presently used designs, light from a spectrally broad  
18 source is collected by a condensing lens and illuminates a spatial  
19 light modulator system. The spatial light modulator system comprises  
20 a two-dimensional array of pixels and the amount of light transmitted  
21 through each pixel is controlled electronically. A projection lens  
22 then images the array of pixels on a viewing screen, the magnification  
23 of the displayed image being determined by the particular  
24 characteristics of the projection lens. The light impinging on each